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| 课程名（Coursename） Inorganic III – Characterisation Methods  课程代码（Coursenumber） C1  课程对象（Audience） Undergraduate  开课教师（Teacher） Dr M. J. Duer and Prof. C. P. Grey  学期（Semester） L 4–8  课程描述（Description）） Whilst a fairly standard set of characterisation tools are available to the organic chemist, the more diverse range of compounds embodied in inorganic chemistry necessarily demands a much greater range of experimental methods for characterisation. In this course we focus on the use of multinuclear NMR, particularly for the characterisation of main group compounds and diamagnetic transition metal complexes. Secondly we explore the use of magnetic measurements and EPR spectroscopy to probe the electronic structure of paramagnetic complexes of the d- and f -block elements. This set of lectures complements the IB Spectroscopy, Part II organic (spectroscopy) courses and the Part II physical course on the theory of NMR spectroscopy, but also introduce new techniques that apply more specifically to inorganic systems. Dr M. J. Duer: 6 lectures The first six lectures primarily focus on studies of diamagnetic inorganic compounds through multinuclear NMR including  Topics Basic theory; pulse sequences 1-D and 2-D NMR. Multinuclear NMR: use in structure determination for common nuclei, exemplified by 11B, 195Pt and 31P. Chemical shifts: shielding effects and extended chemical shift ranges in inorganic systems; information about non-covalent interactions. Coupling: first vs second order coupling; quadrupolar coupling and paramagnetism. Homo- and hetero-nuclear 2D techniques in structure determination. Relaxation effects on spectra. Exchange effects. Solid state NMR in structure determination: chemical shift anisotropy, dipolar coupling. Achieving solution-like spectra in the solid state: magic angle spinning. Studying molecular motion in the solid state. Prof. C. P. Grey: 6 lectures The second half of this course examines two techniques which are used to characterize the electronic structure of a paramagnetic complex: magnetic measurements and EPR spectroscopy. Topics Paramagnetism and diamagnetism: Spin (S ), orbital (L) and total angular momentum (J) contributions to magnetism. Magnetism of the free ion: Term symbols and magnetism of the lanthanides. Quenching of orbital angular momentum; More on term symbols for common Oh and Td complexes; the Van Vleck formula and spin-only magnetic moment for d-block metals. Basics of EPR spectroscopy: electron-Zeeman, nuclear-Zeeman interactions and electronnuclear interactions. The g-value and hyperfine coupling, aE. Information which can be extracted from EPR spectra: localized and delocalized magnetic orbitals; spin-polarisation. Solid state EPR: g-value and hyperfine anisotropy. EPR spectra of compounds with S > 1=2 ; zero-field splitting effects.  课时信息（Totalhours）  教参信息（Textbookinfo） 1 Computational Methods and Experiments in Materials Characterisation III by A. A. Mammoli and C. A. Brebbia (Hardcover - May 11, 2007) ISBN-13: 978-1845640804 世界各地拥有馆藏的图书馆（OCLC）:30 2 Physical Methods for Materials Characterisation, Second Edition (Series in Material Science and Engineering) by Peter E.J. Flewitt and R.K. Wild (Paperback - Dec. 15, 2001) ISBN-13: 978-0750308083 世界各地拥有馆藏的图书馆（OCLC）:153 3 Computational Methods in Materials Characterisation (High Performance Structures and Materials) by A. A. Mammoli and C. A. Brebbia (Hardcover - Oct. 15, 2003) – Illustrated ISBN-13: 978-1853129889 世界各地拥有馆藏的图书馆（OCLC）:35 4 Earliest Life on Earth: Habitats, Environments and Methods of Detection by Suzanne D. Golding and Miryam Glikson (Hardcover - Sept. 29, 2010) ISBN-13: 978-9048187935 世界各地拥有馆藏的图书馆（OCLC）:3 5 Materials Characterisation IV: Computational Methods and Experiments (WIT Transactions on Engineering Sciences) by C. A. Brebbia and A. A. Mammoli (Hardcover - June 10, 2009) ISBN-13: 978-1845641894 世界各地拥有馆藏的图书馆（OCLC）:26 6 Dynamic Characterisation of Analogue-to-Digital Converters (The Springer International Series in Engineering and Computer Science) by Dominique Dallet and José Machado da Silva (Hardcover - Nov. 7, 2005) ISBN-13: 978-0387259024 世界各地拥有馆藏的图书馆（OCLC）:86 7 Methods in Modern Biophysics by Bengt Nölting (Paperback - Oct. 5, 2009) ISBN-13: 978-3642030215 世界各地拥有馆藏的图书馆（OCLC）:47 8 Characterisation of Porous Solids VIII: Proceedings of the 8th International Symposium on the Characterisation of Porous Solids (Special Publications) by Nigel Seaton, Francisco Rodríguez Reinoso, Philip Llewellyn, and Stefan Kaskell (Hardcover - Apr. 14, 2009) ISBN-13: 978-1847559043 世界各地拥有馆藏的图书馆（OCLC）:65 9 Seismic Stratigraphy, Basin Analysis and Reservoir Characterisation, Volume 37 (Handbook of Geophysical Exploration: Seismic Exploration) by Paul C. H. Veeken (Hardcover - Jan. 3, 2007) ISBN-13: 978-0080453118 世界各地拥有馆藏的图书馆（OCLC）:125 10 Characterisation in Federations: Six Countries Compared by Gregory Dening Taylor (Paperback - Nov. 14, 2005) ISBN-13: 978-3540271918 世界各地拥有馆藏的图书馆（OCLC）:135 |